

South Dakota AFNR

Academic Integration Activities: Example #10

→ *Natural Resources students use comprehension skills to read articles about natural resource systems.*

1. Ag Standard

Natural Resources--NR1.1

Explain resource management components to establish relationships in natural resource systems.

2. Academic Standard

11.R.2.2

Students can read fluently to comprehend grade-level text.

- > Apply fluency strategies: skimming, scanning, and predicting.

3. Background Information

Reading comprehension (understanding what is read) can be improved when strategies are employed.

Scanning

As the name implies, you scan the entire text looking for key terms or main points. You take a quick look at images and graphs. The scanning process should only take 5 to 10 seconds per page. The goal is to get a general sense of the text.

Skimming

Skimming is more involved than scanning, but still not reading every word. You might read the first and last sentences of paragraphs because that's where main ideas are often provided. The goal is to find the main ideas provided in the text.

Predicting

After scanning and skimming, but before reading the text word-for-word, take a moment to predict what the text will communicate: will the text share an opinion, tell a story, provide useful information, challenge existing ideas, etc?

4. Example in Context

Share the following article on screen or in a handout with students.

First, demonstrate how you would scan the article. (Quick look for key info: 5 to 10 seconds)

- > Note the title.
- > Note the image of leafy spurge.
- > Note the words "enemies" and "outcompete" used frequently.

Next, demonstrate how you would skim the article (“reading” at three to four times normal speed).

- > Note the first sentence (nice summary).
- > Note the next-to-last paragraph, which contains the key points.

Next, demonstrate how you would predict what the text will communicate.

- > Explain that the title makes you think the text will tell about the reasons something is happening.
- > Share that you think the reasons will have something to do with exotic plants, their enemies, and the climate change.

Read the article aloud, stopping to make comments, reflecting on your prediction. You can also comment on information in the text that is less useful than other text (such as who funded the research) and how you can sort that out by relying on what you learned from scanning, skimming, and predicting.

Discuss how this article helps deepen understanding of how natural resource systems are inter-related and why proper management is key.

Why Invasive Plants Take Over

By Don Comis

April 30, 2009

New research shows that two key causes of plant invasion--escape from natural enemies, and increases in plant resources--act in concert. This result helps to explain the dramatic invasions by exotic plants occurring worldwide. It also indicates that global change is likely to exacerbate invasion by exotic plants.



Agricultural Research Service (ARS) ecologist Dana Blumenthal reached these conclusions after studying 243 European plant species and their fungal and viral pests, both in Europe and in the United States.

The study was published this week in the Proceedings of the National Academy of Sciences. Blumenthal, based at the ARS Rangeland Resources Research Unit in Fort Collins, Colo., and colleagues at the University of North Carolina and in the Czech Republic showed that fast-growing plant species adapted to moist, nitrogen-rich soils had many fungal and viral pathogens in the areas where the weedy species evolved. Once these species arrived here, they escaped many of their long-time enemies.

Such an escape from numerous enemies is thought to provide exotic species with an advantage over native species still burdened by their enemies. This is the first study, however, to show that whether a plant escapes from a few or an unusually larger number of enemies can be predicted from the type of plant: Exotic species that are fast-growing and weedy are likely to have more enemies to escape from.

Unfortunately, these are the same species most favored by global change. Fast-growing weedy species thrive in environments with ample plant resources. And global change increases key plant resources, such

as carbon dioxide and soil nitrogen, through increases in the greenhouse gases carbon dioxide and nitrous oxide, respectively.

Fast-growing, weedy exotic species therefore have a double advantage in today's world. Increases in resources enable them to outcompete slow-growing plants. An escape from an unusually large number of enemies enables them to outcompete even fast-growing native plants. As global change proceeds, continuing increases in resource availability are likely to exacerbate such plant invasions.

The National Science Foundation, the European Union, and the Czech Republic supported the study. ARS is the principal intramural scientific research agency in the U.S. Department of Agriculture.

Note: This article can be found online at
http://www.ars.usda.gov/is/pr/2009/090430.htm?pf=1#_top

5. Guided Practice Exercises

Share the next article. Follow the same steps, but have the group respond to the questions first. Clarify and assist only as needed.

Scan the article. (Quick look for key info: 5 to 10 seconds)

- > What did you take note of?

Skim the article ("reading" at three to four times normal speed).

- > What key information stands out to you?

Predict what the text will communicate.

- > What will this article tell us? Why do you think that?

Read the article aloud, stopping to make comments reflecting on the group's prediction.

Again, reflect on how this article helps deepen understanding of how natural resource systems are inter-related and why proper management is key.

Elevated Carbon Dioxide Spurs Shrub Growth

By Rosalie Marion Bliss

August 28, 2007

Shrubs far outgrew native grasses in Colorado rangeland when exposed to elevated levels of carbon dioxide (CO₂), according to a study published by Agricultural Research Service (ARS) scientists and cooperators at Colorado State University.



The results suggest that rising CO₂ levels in the Earth's atmosphere may be contributing to shifts in plant community dynamics, in which woody vegetation is favored over perennial forage grasses.

The study will be published in this week's online edition of the Proceedings of the National Academy of Sciences. Plant physiologist Jack A. Morgan, research leader of the ARS Rangeland Resources Research Unit in Fort Collins, Colo., led the study. ARS is the U.S. Department of Agriculture's chief scientific research agency.

During the past 200 years, shrubs have expanded their reach into many of the world's grasslands, reducing the amount and quality of forage available to livestock. Some scientists theorize that elevated atmospheric CO₂ concentrations have spurred that growth. But evidence as to the underlying reasons behind the problem of woody plant encroachment has been lacking.

The experiment was conducted on native short grass prairie in northern Colorado. To simulate elevated atmospheric CO₂ conditions and make comparisons, the scientists used six large open-top chambers. Three of the chambers were infused with air injected with 360 parts per million (ppm) of CO₂—to model today's atmosphere. The other three chambers were infused with air injected with twice the control amount—or 720 ppm—of CO₂. That's roughly the atmospheric concentration expected by the end of the century.

*Among the 34 plant species exposed to 720 ppm of CO₂, the scientists found a 40-fold increase in aboveground biomass of fringed sage, *Artemisia frigida*, a widespread shrub in rangelands of North America and Asia. Growth of only one other species, *Stipa comata*, a relatively low-forage-quality perennial grass, was also significantly affected by the CO₂, as previously reported. *S. comata* showed only a two-fold increase in biomass due to CO₂.*

The results support present theories that rising CO₂ may be altering the botanical structure of world grasslands and contributing to their degradation.

Note: This article can be found online at

http://www.ars.usda.gov/is/pr/2007/070828.htm?pf=1#_top

6. Independent Practice Exercises

Direct students to the News archive of the USDA Agricultural Research Service:

<http://www.ars.usda.gov/is/pr/>

- > Find an article that addresses the relationships in natural resource systems
- > Browse the article titles. Select an article and use scanning and skimming to predict if the article meets the assignment requirements.
 - If so, print the article and highlight or circle the components and or words that led you to make the prediction.
 - If not, search for another article until you find one.

7. Notes

Repeat these strategies on occasion to reinforce their use.